AR EDITION
TAP TO OPEN VIRTUAL GALLERY

GUIDE STEP-BY-STEP
A COMPLETE GUIDE

IBS STEEL FRAMING SYSTEM

MODERN CONSTRUCTION TECHNOLOGY FOR TVET AND INDUSTRY



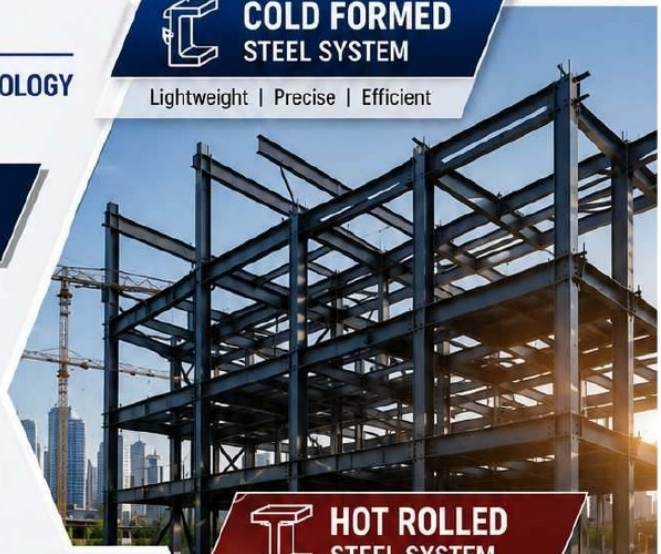
COLD FORMED STEEL SYSTEM
Lightweight | Precise | Efficient

PANDUAN LENGKAP
LANGKAH DEMI LANGKAH

PREPARED BY:
Ts. Anuar Bin Nordin

PREPARED BY:
Ts. Dr. Hassan Bin Ismail

INSTITUTION:
Politeknik Premier Merlimau Melaka



HOT ROLLED STEEL SYSTEM
Strong | Durable | Structural Excellence

TARGET AUDIENCE:

TVET STUDENTS | CONTRACTORS | SITE SUPERVISORS | CONSTRUCTION PRACTITIONERS

FASTER CONSTRUCTION | STRONG & RELIABLE | PRECISE ENGINEERING | SUSTAINABLE SOLUTION | HIGHER PRODUCTIVITY

BUILD SMARTER
BUILD BETTER

POLITEKNIK MERLIMAU MELAKA
JABATAN KEJURUTERAAN AWAM

AR INTERACTIVE EDITION

IBS

STEEL FRAMING SYSTEM

Modern Construction Technology for TVET and Industry

EXPLORE | OBSERVE | COMPARE | APPLY

Ts. Anuar Bin Nordin
Ts. Dr. Hassan Bin Ismail
Politeknik Merlimau Melaka
2026

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HAK CIPTA

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AR Interactive Edition

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Pautan kepada CIDB IBS Virtual Gallery disediakan untuk tujuan pendidikan. Nama, tanda dagangan dan bahan dalam talian kekal menjadi hak milik pemilik masing-masing. Kandungan atau alamat web pihak ketiga mungkin berubah dari semasa ke semasa.

CIP
MALAYSIA

DATA PENGKATALOGAN-DALAM-PENERBITAN

PERPUSTAKAAN NEGARA MALAYSIA

e-book ini dikemas kini selepas pendaftaran rasmi dengan Perpustakaan Negara Malaysia.

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FRONT MATTER 01

PREFACE

Connecting IBS knowledge, industry practice and digital exploration

A PRACTICAL LEARNING BRIDGE

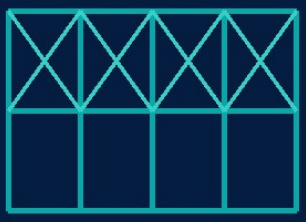
The construction industry is evolving towards methods that are faster, safer, more precise and more sustainable. Industrialised Building System (IBS) is central to this transformation because it connects standardised design, controlled production and systematic on-site assembly.

This eBook introduces the fundamental concepts of IBS and provides focused guidance on steel framing systems. It is written in clear, practical English for TVET students, educators, contractors, site supervisors and construction practitioners who need an accessible reference for learning and workplace application.

The AR Interactive Edition extends the printed content through QR codes and web links to the CIDB IBS Virtual Gallery. Readers can examine digital exhibits, compare IBS components and relate technical explanations to three-dimensional examples. The virtual experience is intended to support observation and critical thinking, not replace supervised practical training or approved project documentation.

Readers are encouraged to explore actively, record evidence responsibly and connect each topic to safety, quality, productivity and sustainability. We hope this eBook supports meaningful learning and inspires confident participation in modern construction technology.

LEARNING
THROUGH EXPLORATION



01 **EXPLORE**
Navigate the Virtual Gallery

02 **OBSERVE**
Identify real IBS components

03 **COMPARE**
Evaluate systems and uses

04 **APPLY**
Connect evidence to practice

INTENDED OUTCOME

By the end of this eBook, readers should be able to explain key IBS principles, recognise major steel-framing components, interpret basic construction processes, and make informed observations using both written and virtual learning resources.

Ts. Anuar Bin Nordin
Ts. Dr. Hassan Bin Ismail
Politeknik Merlimau Melaka | 2026

FRONT MATTER 02

ACKNOWLEDGEMENT

With appreciation to the people and resources that support meaningful TVET learning

The authors gratefully acknowledge the support, knowledge and encouragement received throughout the preparation of this eBook and its AR Interactive Edition.

01 **INSTITUTIONAL SUPPORT**

Sincere appreciation is extended to the management of Politeknik Merlimau Melaka and the Department of Civil Engineering for fostering innovation in teaching, learning and technical education.

02 **DIGITAL LEARNING RESOURCE**

CIDB Malaysia's IBS Virtual Gallery is acknowledged as a valuable public reference that enriches this eBook with digital exhibits, component information and immersive learning opportunities.

03 **ACADEMIC & INDUSTRY COMMUNITY**

We thank fellow educators, technical officers, construction practitioners and industry contributors whose professional experience continues to strengthen the relevance of IBS education.

04 **LEARNERS & PRACTITIONERS**

Special thanks are dedicated to TVET students, contractors, site supervisors and readers whose curiosity, feedback and practical engagement give purpose to the development of this learning resource.

A SHARED COMMITMENT TO BETTER LEARNING

This eBook reflects a shared commitment to accessible technical knowledge, safe construction practice and future-ready TVET education. Every contribution - whether institutional, academic, industrial or learner-led - has helped shape a resource intended to build competence and confidence.

RESOURCE NOTE

References to the CIDB IBS Virtual Gallery are provided for educational purposes. All names, trademarks and online materials remain the property of their respective owners; their inclusion does not imply formal endorsement of this publication.

With sincere appreciation,
The Authors

AR START 01

IBS STEEL FRAMING SYSTEM

Explore. Observe. Compare. Apply.

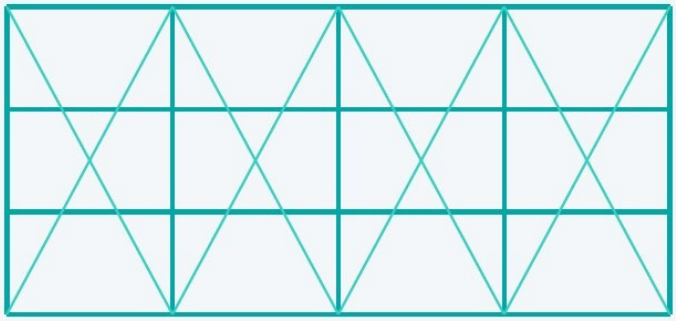
AR-ENHANCED EBOOK EDITION

This edition connects the original eBook to the CIDB IBS Virtual Gallery through QR codes and clickable links. Explore the 3D tour, search real IBS components and evaluate sample houses while you learn.

SCAN TO ENTER

CIDB IBS Virtual Gallery

OPEN GALLERY



DIGITAL-TO-PHYSICAL LEARNING

01 VIRTUAL TOUR

Walk through an immersive 3D component gallery and observe real exhibits.

02 PRODUCT WAREHOUSE

Filter IBS systems, manufacturers and states to compare industry solutions.

03 SAMPLE HOUSE

Review open systems, housing types and future construction technologies.

EXPERIENCE TYPE

QR-activated, web-based immersive 3D learning. This AR-enhanced eBook links printed and digital content to live virtual exhibits; the gallery content may be updated by CIDB over time.

LAUNCH 3D TOUR

DIRECT GALLERY

CIDB IBS Virtual Gallery integration | Accessed 4 August 2026

AR STARTER PACK

AR START 02

HOW TO USE THIS AR EBOOK

No special app is required for the linked web experience.

01 TAP OR SCAN

Tap an AR button in the PDF, or scan the QR code from a printed page.

02 SELECT A MODE

Choose Virtual Tour, Product Warehouse or Sample House.

03 EXPLORE EVIDENCE

Observe components, connections, product data, building type and system use.

04 RETURN AND APPLY

Complete the AR Mission page and explain your decision using evidence.

DEVICE CHECK

- Stable internet connection
- Current Chrome, Edge, Firefox or Safari
- WebGL and hardware acceleration enabled
- [illegible]ur
- [illegible]

SAME DEVICE?

Tap the button instead of scanning. The gallery opens in your browser. Return to the PDF after each observation.

OPEN OFFICIAL PAGE

OPEN DIRECT GALLERY

AR LEARNING ROUTINE

Observe: What do you see? Identify: Which IBS system or component is shown? Explain: How does it work? Evaluate: Why is it suitable?

CIDB IBS Virtual Gallery integration | Accessed 4 August 2026

HOW TO USE

AR START 03

AR LEARNING JOURNEY

Follow the gallery route that matches each chapter.

CH 1

IBS FOUNDATIONS

VIRTUAL TOUR

Recognise prefabrication, standardisation and on-site assembly.

CH 2

IBS IN MALAYSIA

VIRTUAL TOUR + SAMPLE HOUSE

Connect productivity, quality and sustainability to national transformation.

CH 3

TYPES OF IBS

PRODUCT WAREHOUSE

Compare blockwork, precast, metal framing, formwork and innovative systems.

CH 4

STEEL FRAMING

METAL FRAMING FILTER

Identify products, structural roles, components and applications.

CH 5

AGiBS CASE STUDY

SAMPLE HOUSE

Review building solutions, construction workflow and suitability.

CH 6

SYNTHESIS

AR PORTFOLIO

Use gallery evidence to justify a future-ready IBS solution.

START THE GALLERY

Look for the small AR badge on key content pages. It is clickable in this PDF.

CIDB IBS Virtual Gallery integration | Accessed 4 August 2026

AR LEARNING MAP

AR START 04

ACCESS, EVIDENCE AND TROUBLESHOOTING

A practical fallback is available when the 3D viewer cannot load.

A IF THE 3D TOUR LOADS

1. Use the navigation controls to move through the space.
2. Pause at component displays and read visible labels.
3. Capture notes, not personal data.
4. Return to the eBook mission page.

B IF THE 3D TOUR DOES NOT LOAD

1. Update the browser and enable WebGL or hardware acceleration.
2. Retry on a stable network.
3. Use Product Warehouse for searchable text and product cards.
4. Use Sample House for a visual case review.

WHAT COUNTS AS TECHNICAL EVIDENCE?

COMPONENT	Correct name, material and structural/non-structural role
SYSTEM	IBS category and relationship to other building elements
PROCESS	Factory production, transport, connection and site installation
DECISION	Suitability supported by quality, time, cost, safety or sustainability

RESPONSIBLE USE

Treat the gallery as a current learning resource. Product listings are examples, not endorsements. Do not copy contact details into assignments unless required. Cite the gallery access date and separate what you observed from your own technical inference.

OPEN ACCESSIBLE GALLERY

CIDB IBS Virtual Gallery integration | Accessed 4 August 2026

ACCESS GUIDE

CONTENTS 01 / 03

TABLE OF CONTENTS

Chapters 1-2 | IBS foundation and Malaysian context

INTERACTIVE CONTENTS Tap a chapter, topic row or AR mission to navigate directly.

START CHAPTER 1

01 CHAPTER 1

INTRODUCTION TO INDUSTRIALISED BUILDING SYSTEM (IBS)

Digital pages 12-20

NO.		PAGE
1.1	Introduction	12
1.2	Objectives of the Chapter	16
1.3	Importance of IBS in Modern Construction	18
1.4	Overview of IBS Steel Framing System	19
1.5	Summary	20

LEARNING FOCUS

IBS principles, benefits and modern construction context

AR MISSION 1

02 CHAPTER 2

IBS IN MALAYSIA

Digital pages 23-31

NO.		PAGE
2.1	Introduction to IBS in Malaysia	23
2.2	Objectives of IBS Implementation	24
2.3	Government Support for IBS	25
2.4	Role of CIDB Malaysia	26
2.5	IBS and Sustainable Construction	26
2.6	Challenges of IBS Implementation	28
2.7	Future of IBS in Malaysia	29
2.8	Summary	29

LEARNING FOCUS

National strategy, CIDB, sustainability and future direction

AR MISSION 2

LEARNING ROUTE

01 SELECT
Choose a chapter

02 EXPLORE
Open the topic page

03 APPLY
Complete the AR mission

Page numbers refer to the digital PDF pages shown in the PMM footer.

CONTENTS 02 / 03

SYSTEMS & STEEL FRAMING

Chapters 3-4 | Compare IBS systems and investigate steel framing

03 CHAPTER 3
TYPES OF IBS SYSTEMS

Digital pages 32-41

NO.		PAGE
3.1	Introduction to IBS Systems	32
3.2	Precast Concrete System	33
3.3	Blockwork System	34
3.4	Steel Framing System	35
3.5	Timber Framing System	36
3.6	Formwork System	37
3.7	Innovative System	38
3.8	Comparison of IBS Systems	39
3.9	Importance of IBS System Selection	40
3.10	Summary	41

LEARNING FOCUS

System characteristics, comparison and project selection

AR MISSION 3

04 CHAPTER 4
STEEL FRAMING SYSTEM

Digital pages 43-55

NO.		PAGE
4.1	Introduction to Steel Framing System	43
4.2	What is Steel Framing System?	44
4.3	Types of Steel Framing Systems	45
4.4	Main Components of Steel Framing System	46
4.5	Construction Process of Steel Framing System	47
4.6	Advantages of Steel Framing System	48
4.7	Disadvantages of Steel Framing System	49
4.8	Safety Practices in Steel Framing Construction	50
4.9	Steel Framing and BIM Technology	51
4.10	Sustainable Construction Using Steel Framing	52
4.11	Applications of Steel Framing System	53
4.12	Future of Steel Framing System	54
4.13	Summary	55

LEARNING FOCUS

Components, workflow, safety, BIM and sustainability

AR MISSION 4

CONTENTS 03 / 03

CASE STUDY & QUICK ACCESS

Chapter 5 | AGiBS application, AR missions, synthesis and references

05

CHAPTER 5
MALAYSIAN IBS CASE STUDY (AGiBS)

Digital pages 57-64

NO.		PAGE
5.1	Introduction to Malaysian IBS Case Study	57
5.2	What is AGiBS?	57
5.3	Objectives of AGiBS	58
5.4	Main Features of AGiBS	58
5.5	Construction Process Using AGiBS	59
5.6	Applications of AGiBS in Malaysia	60
5.7	Advantages of AGiBS	60
5.8	Challenges of AGiBS Implementation	61
5.9	AGiBS and BIM Technology	61
5.10	AGiBS and Sustainable Construction	62
5.11	Future of AGiBS in Malaysia	62
5.12	Importance of AGiBS for TVET Students	63
5.13	Summary	64

LEARNING FOCUS

Malaysian industry application and complete-system review

AR MISSION 5

QUICK ACCESS

Front matter, starter guide and five applied learning missions

- PREFACE 02
- ACKNOWLEDGEMENT 03
- AR STARTER PACK 04-07
- MISSION 1 | IBS PRINCIPLE 21
- MISSION 2 | MALAYSIA 30
- MISSION 3 | SYSTEM LAB 42
- MISSION 4 | STEEL FRAME 56
- MISSION 5 | SAMPLE HOUSE 65

SYNTHESIS & REFERENCE

Conclude, submit evidence and consult sources

06 **Conclusion** Digital pag 66

AR **Evidence Portfolio** Digital pag 67

07 **References** Digital pag 68

TIP: USE PDF BOOKMARKS FOR FAST NAVIGATION

Topic rows and mission buttons are also clickable.

CHAPTER 1

INNOVATION | TECHNOLOGY | PRODUCTIVITY | SUSTAINABILITY

INTRODUCTION TO INDUSTRIALISED BUILDING SYSTEM (IBS)

Building Smarter, Faster and More Sustainable Construction



Explore the fundamentals of Industrialised Building System (IBS), its importance in modern construction, and how it transforms conventional building methods into efficient, technology-driven, and sustainable construction practices.

KEY LEARNING AREAS

- WHAT IS IBS?
- IBS VS CONVENTIONAL CONSTRUCTION
- BENEFITS OF IBS TECHNOLOGY
- IBS IN MALAYSIA
- MODERN CONSTRUCTION METHODS
- FUTURE CONSTRUCTION TECHNOLOGIES

IBS TECHNOLOGIES

- PRECAST CONCRETE SYSTEM
- BLOCKWORK SYSTEM
- STEEL FRAMING SYSTEM
- TIMBER FRAMING SYSTEM
- FORMWORK SYSTEM
- INNOVATIVE IBS SYSTEM

FUTURE CONSTRUCTION TECHNOLOGIES

- BUILDING INFORMATION MODELLING (BIM)
- ARTIFICIAL INTELLIGENCE (AI)
- INTERNET OF THINGS (IoT)
- SMART CITY DEVELOPMENT
- INDUSTRIAL REVOLUTION 4.0 (IR4.0)
- SUSTAINABLE CONSTRUCTION

TARGET AUDIENCE

- TVET STUDENTS
- CONTRACTORS
- SITE SUPERVISORS
- ENGINEERS
- CONSTRUCTION PRACTITIONERS

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INSTITUTION:
Politeknik Premier Merlimau Melaka

TRANSFORMING CONSTRUCTION THROUGH

5

EXPLORE IN AR: VIRTUAL TOUR

CHAPTER 1 - INTRODUCTION TO INDUSTRIALISED BUILDING SYSTEM (IBS)

🏗️ **BUILD SMARTER • BUILD FASTER • BUILD SUSTAINABLY**

🔹 WHY DOES THE CONSTRUCTION INDUSTRY NEED CHANGE?

Challenges of Conventional Construction

❌ **Project Delays**

❌ **Material Wastage**

❌ **Inconsistent Construction Quality**

❌ **Safety Risks on Site**

❌ **High Dependency on Foreign Labour**

❌ **Low Productivity**

🔹 WHAT IS IBS?

Industrialised Building System (IBS)

IBS is a modern construction method where building components are:

🏭 **Manufactured in Factories**

🚛 **Transported to Construction Sites**

🔧 **Assembled Systematically On-Site**

This approach reduces conventional site activities and improves construction efficiency.

🔹 KEY CHARACTERISTICS OF IBS

Modern Construction Features

⚙️ **Prefabrication Technology**

📏 **Standardized Components**

🏗️ **Systematic Installation**

🎯 **High Precision Manufacturing**

🛡️ **Better Quality Control**

🌱 **Sustainable Construction Practice**



🔹 IBS IN MALAYSIA

National Construction Transformation Strategy

Strong Government Support

🏢 **Promoted by CIDB Malaysia**

📚 **Training & Certification Programs**

💰 Incentives for Industry Adoption

📈 Improved Industry Productivity

🌍 Supports Sustainable Development Goals

🔹 BENEFITS OF IBS

Why Industry Prefers IBS?

🚀 Faster Project Completion

🎯 Better Construction Quality

👷 Reduced Labour Dependency

🛡️ Improved Site Safety

♻️ Reduced Construction Waste

🌱 Environmentally Friendly

💵 Better Cost Efficiency

📈 Higher Productivity

🔹 IBS & DIGITAL CONSTRUCTION

Future Construction Technology

🖥️ Building Information Modelling (BIM)

🤖 Artificial Intelligence (AI)

📡 Internet of Things (IoT)

🏙️ Smart City Development

📊 Digital Project Management

⚙️ Industrial Revolution 4.0 (IR4.0)

🔹 WHY SHOULD TVET STUDENTS LEARN IBS?

💡 KEY TAKEAWAY

"IBS is transforming construction from traditional methods into a smarter, faster, safer, and more sustainable industry."

🏭 Factory-Based Production

⚡ Faster Construction

🎯 Better Quality

♻️ Sustainable Development

🏙️ Future-Ready Construction Technology

IBS = The Future of Modern Construction 🚀🏗️🌱



CHAPTER 1.2 - OBJECTIVES OF THE CHAPTER

🎯 LEARNING OBJECTIVES

🚀 OBJECTIVE 1

INTRODUCE THE CONCEPT OF IBS

🏭 Understand the meaning of Industrialised Building System (IBS)

📦 Learn how prefabricated components are manufactured and assembled

⚙️ Explore the difference between IBS and conventional construction

🏗️ Recognize IBS as a modern construction solution

OBJECTIVE 2

UNDERSTAND THE IMPORTANCE OF IBS IN MALAYSIA

📈 Improve construction productivity

🏢 Support national construction transformation initiatives

👷 Reduce dependency on foreign labour

🌱 Promote sustainable construction practices

🏙️ Contribute towards Smart City development

⭐ OBJECTIVE 3

IDENTIFY THE ADVANTAGES OF IBS

⚡ Faster project completion

🎯 Better construction quality

♻️ Reduced material wastage

🛡️ Improved site safety

💰 Better cost efficiency

📊 Higher project productivity

🏗️ OBJECTIVE 4

EXPLORE IBS STEEL FRAMING SYSTEM

🔩 Understand lightweight steel framing technology

🏭 Learn the prefabrication process

📐 Identify key structural components

🚛 Understand transportation and installation methods

🏢 Discover real industry applications

💻 OBJECTIVE 5

EXPOSURE TO MODERN CONSTRUCTION TECHNOLOGY

🖥️ Building Information Modelling (BIM)

🤖 Artificial Intelligence (AI)

📡 Internet of Things (IoT)

⚙️ Industrial Revolution 4.0 (IR4.0)

🌆 Smart Construction & Smart City Technologies

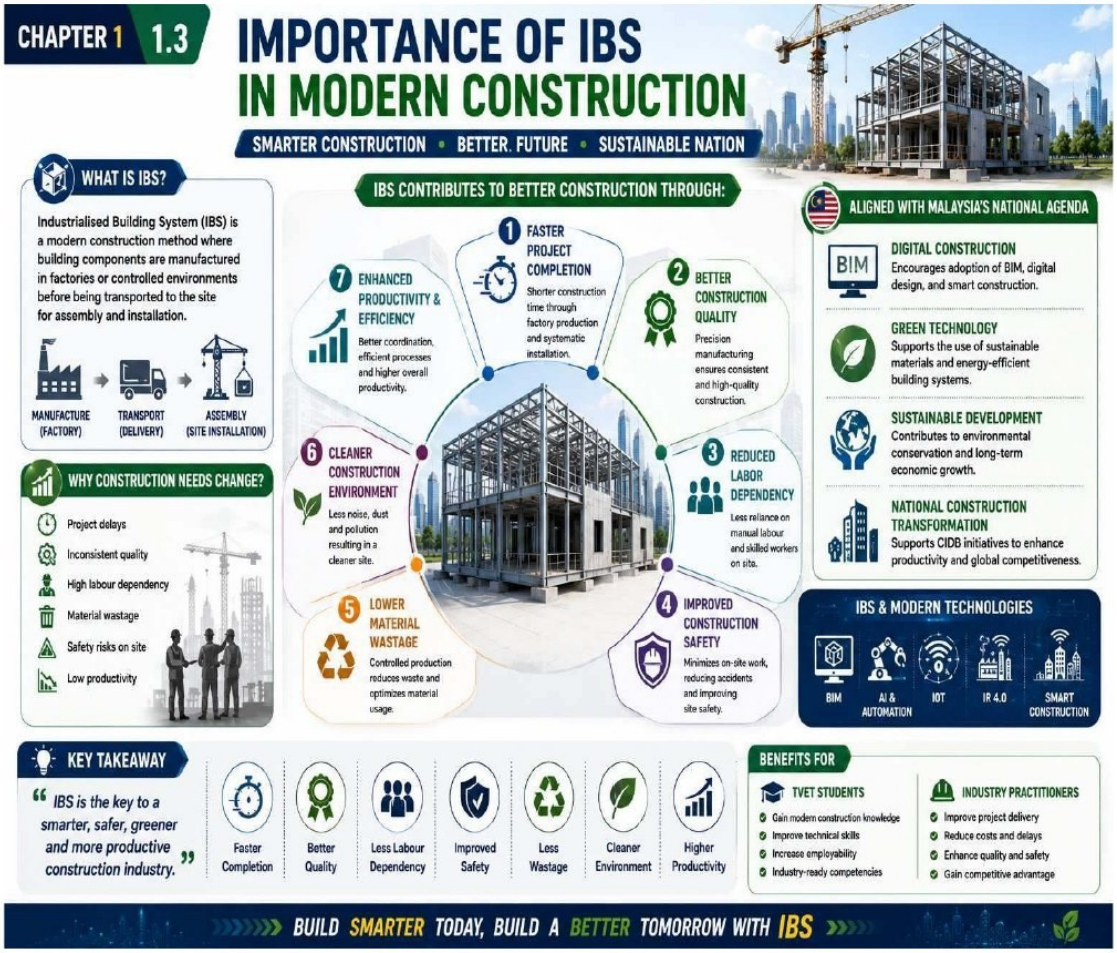


CHAPTER 1.3 - IMPORTANCE OF IBS IN MODERN CONSTRUCTION

The construction industry is continuously evolving towards smarter, safer, and more sustainable construction methods. IBS plays an important role in achieving these goals through:

- Faster project completion
- Better construction quality
- Reduced labor dependency
- Improved construction safety
- Lower material wastage
- Cleaner construction environment
- Enhanced productivity and efficiency

The adoption of IBS is also aligned with Malaysia's national agenda in promoting digital construction, green technology, and sustainable development.



CHAPTER 1.4 - OVERVIEW OF IBS STEEL FRAMING SYSTEM

IBS Steel Framing System is one of the most widely used IBS categories in modern construction. The system uses prefabricated steel components manufactured in factories before installation at the construction site.

Common steel framing components include:

- Steel columns
- Steel beams
- Wall framing systems
- Roof trusses
- Floor joists
- Hollow sections
- C-channels and U-channels

Steel framing systems are generally divided into two main categories:

1. Cold Formed Steel System
2. Hot Rolled Steel System

Both systems offer excellent structural performance and faster construction processes compared to conventional methods.



CHAPTER 1.5 - SUMMARY

💡 WHAT HAVE WE LEARNED?

Industrialised Building System (IBS) is transforming the construction industry through modern, efficient, and sustainable construction practices.

By shifting construction activities from site-based work to factory-based production, IBS helps deliver higher quality buildings in a shorter period of time.

⭐ KEY BENEFITS OF IBS

Why IBS Matters?

⚡ Faster Construction Process

🏭 Factory-Controlled Manufacturing

🎯 Better Quality & Precision

🛡️ Improved Construction Safety

♻️ Reduced Material Wastage

🌱 Environmentally Friendly Construction

📈 Higher Productivity & Efficiency



AR MISSION 1

SPOT THE IBS PRINCIPLE

Recognise how prefabrication and standardisation appear in real components.

LAUNCH PATH

Open Virtual Tour. Move through the gallery and pause at three diffe

FIELD TASK

1. Locate three exhibits that represent different building components.
2. Name the visible material, shape and intended building function.
3. Identify one clue that suggests factory production or standardisation.
4. Link each exhibit to one IBS benefit discussed in Chapter 1.

AR EVIDENCE RECORD

EXHIBIT / COMPONENT	VISIBLE EVIDENCE	IBS PRINCIPLE	BENEFIT

REFLECT AND JUSTIFY

Which exhibit provides the strongest evidence that IBS can improve construction quality? Explain using one observation and one technical reason.

OPEN GALLERY

CIDB IBS Virtual Gallery integration | Accessed 4 August 2026

AR MISSION 1



EXPLORE IN AR: VIRTUAL TOUR + SAMPLE HOUSE

CHAPTER 2

CHAPTER 2.1 – IBS IN MALAYSIA

The construction industry in Malaysia has undergone significant transformation over the years in response to increasing demands for faster project delivery, better construction quality, improved safety standards, and sustainable development. One of the major initiatives introduced to modernize the construction industry is the implementation of the Industrialised Building System (IBS).



2.2 Objectives of IBS Implementation in Malaysia

The implementation of IBS in Malaysia aims to achieve several important objectives, including:

1. Reduce Dependency on Foreign Labor

2. Improve Project Quality

3. Accelerate Construction Process

4. Reduce Construction Waste

5. Improve Construction Site Safety



2.3 Government Support for IBS

The Malaysian government strongly supports IBS implementation through policies, incentives, training programs, and regulations aimed at increasing industry adoption.

Among the major strategies implemented include:

- Mandatory IBS requirements in government projects
- IBS score assessment system
- Financial incentives and tax exemptions
- IBS training and certification programs
- Promotion of digital construction technologies such as BIM

The government also introduced the IBS Roadmap to strengthen IBS implementation and improve construction industry productivity nationwide.



2.4 Role of CIDB Malaysia

The main organization responsible for promoting IBS in Malaysia is the Construction Industry Development Board, commonly known as CIDB Malaysia. CIDB plays an important role in developing policies, standards, training systems, and implementation guidelines related to IBS construction.



2.5 IBS and Sustainable Construction

IBS is closely related to sustainable construction practices because it promotes:

- Efficient material usage
- Reduced environmental impact
- Lower carbon emissions
- Cleaner construction sites
- Better resource management

In addition, IBS integrates well with modern digital technologies such as:

- Building Information Modelling
- Smart construction systems
- Automation
- Digital project management



2.6 Challenges of IBS Implementation in Malaysia

Although IBS offers many advantages, several challenges still affect its implementation in Malaysia.

Common Challenges:

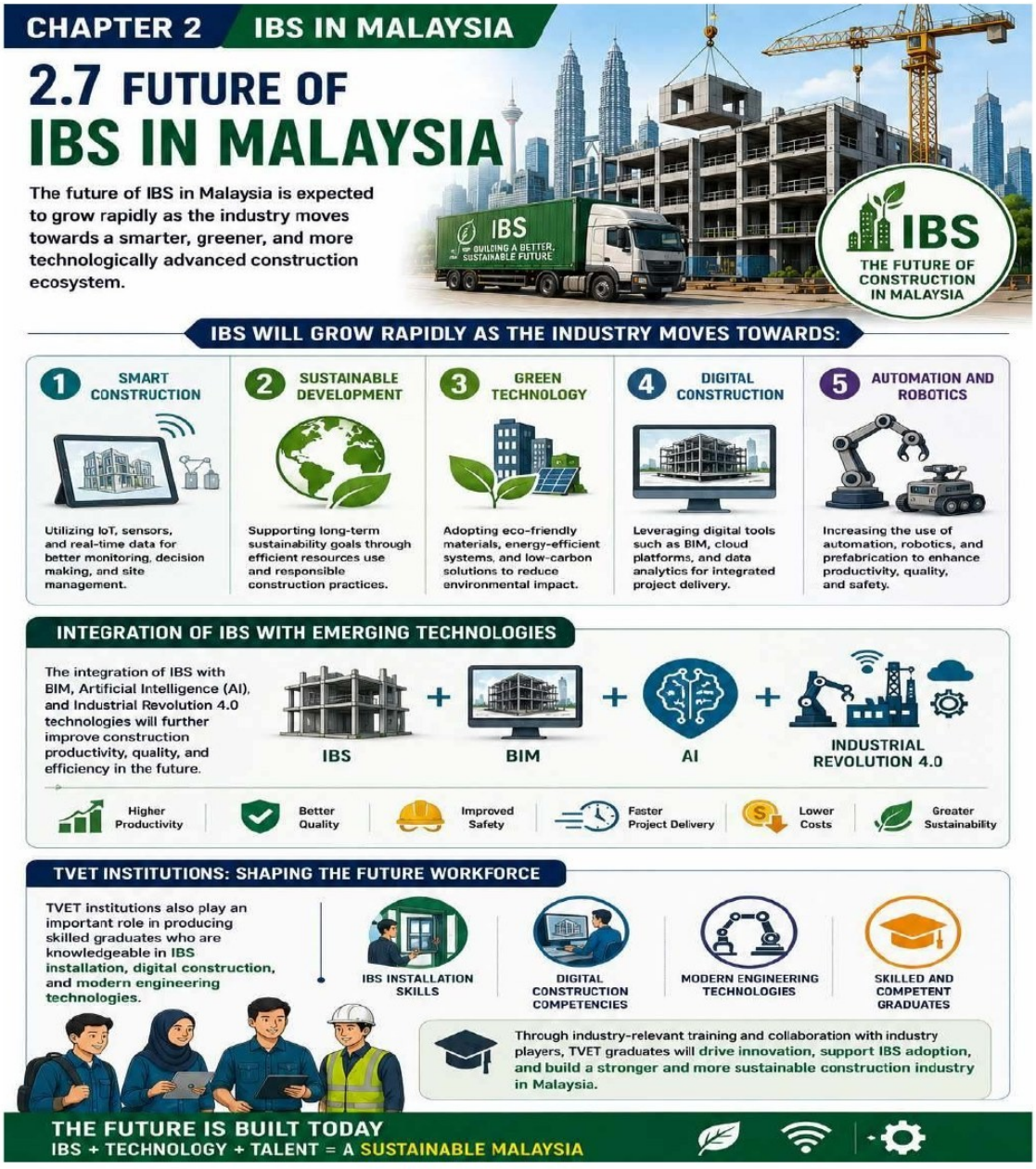
- High initial investment cost
- Limited IBS expertise and skilled workers
- Resistance to change from conventional methods
- Transportation and logistics issues
- Limited IBS manufacturers in certain regions
- Need for better coordination during design stage



2.7 Future of IBS in Malaysia

The future of IBS in Malaysia is expected to grow rapidly as the industry moves towards:

- Smart construction
- Sustainable development
- Green technology
- Digital construction
- Automation and robotics



2.8 Summary

AR MISSION 2

MALAYSIA CONSTRUCTION TRANSFORMATION

Connect industry examples to productivity, quality, safety and sustainability.

LAUNCH PATH

Use Virtual Tour and Sample House. Compare what the exhibits show[illegible]on prior[illegible]

FIELD TASK

1. Select one sample house or open-system exhibit.
2. Identify one productivity, quality and sustainability feature.
3. Explain how standardised components can reduce site dependence.
4. State one challenge Malaysia must manage during wider IBS adoption.

AR EVIDENCE RECORD

PRIORITY	GALLERY EVIDENCE	EXPECTED IMPACT	POSSIBLE CHALLENGE

REFLECT AND JUSTIFY

Based on the gallery evidence, which national objective should receive the highest priority: speed, quality, safety or sustainability? Justify your choice.

OPEN GALLERY

CIDB IBS Virtual Gallery integration | Accessed 4 August 2026

AR MISSION 2

In conclusion, IBS has become an important strategy in transforming the Malaysian construction industry into a more modern, efficient, and sustainable sector. The implementation of IBS helps reduce dependency on foreign labor, improve construction quality, accelerate project completion, reduce material wastage, and enhance site safety.

The strong support provided by the Malaysian government and CIDB Malaysia continues to encourage the adoption of IBS technologies throughout the country. As the construction industry evolves towards digitalization and sustainability, IBS will continue to play a major role in shaping the future of construction in Malaysia.



EXPLORE IN AR: PRODUCT WAREHOUSE

CHAPTER 3

CHAPTER 3.1 – TYPES OF IBS SYSTEMS

The Industrialised Building System (IBS) consists of various construction methods and technologies that utilize prefabricated components manufactured in controlled environments before being assembled at construction sites. In Malaysia, IBS has been widely promoted to improve construction productivity, quality, safety, and sustainability within the construction industry.

The Malaysian construction industry adopts several categories of IBS systems depending on project requirements, building design, construction methods, cost considerations, and material usage. Each IBS system has its own characteristics, advantages, applications, and installation techniques.

According to the Malaysian construction industry classification, there are six main IBS systems commonly used in Malaysia:

1. Precast Concrete System
2. Blockwork System
3. Steel Framing System
4. Timber Framing System
5. Formwork System
6. Innovative System



CHAPTER 3.2 - PRECAST CONCRETE SYSTEM

Precast Concrete System is one of the most widely used IBS systems in Malaysia. This system involves manufacturing concrete components in factories or controlled casting yards before transporting them to construction sites for installation. The components are produced using standardized molds and quality-controlled production processes to ensure consistency and precision.

Typical precast concrete components include:

- Wall panels
- Beams
- Columns
- Slabs
- Staircases
- Drainage systems
- Hollow core slabs



AR FILTER: PRECAST CONCRETE SYSTEMS

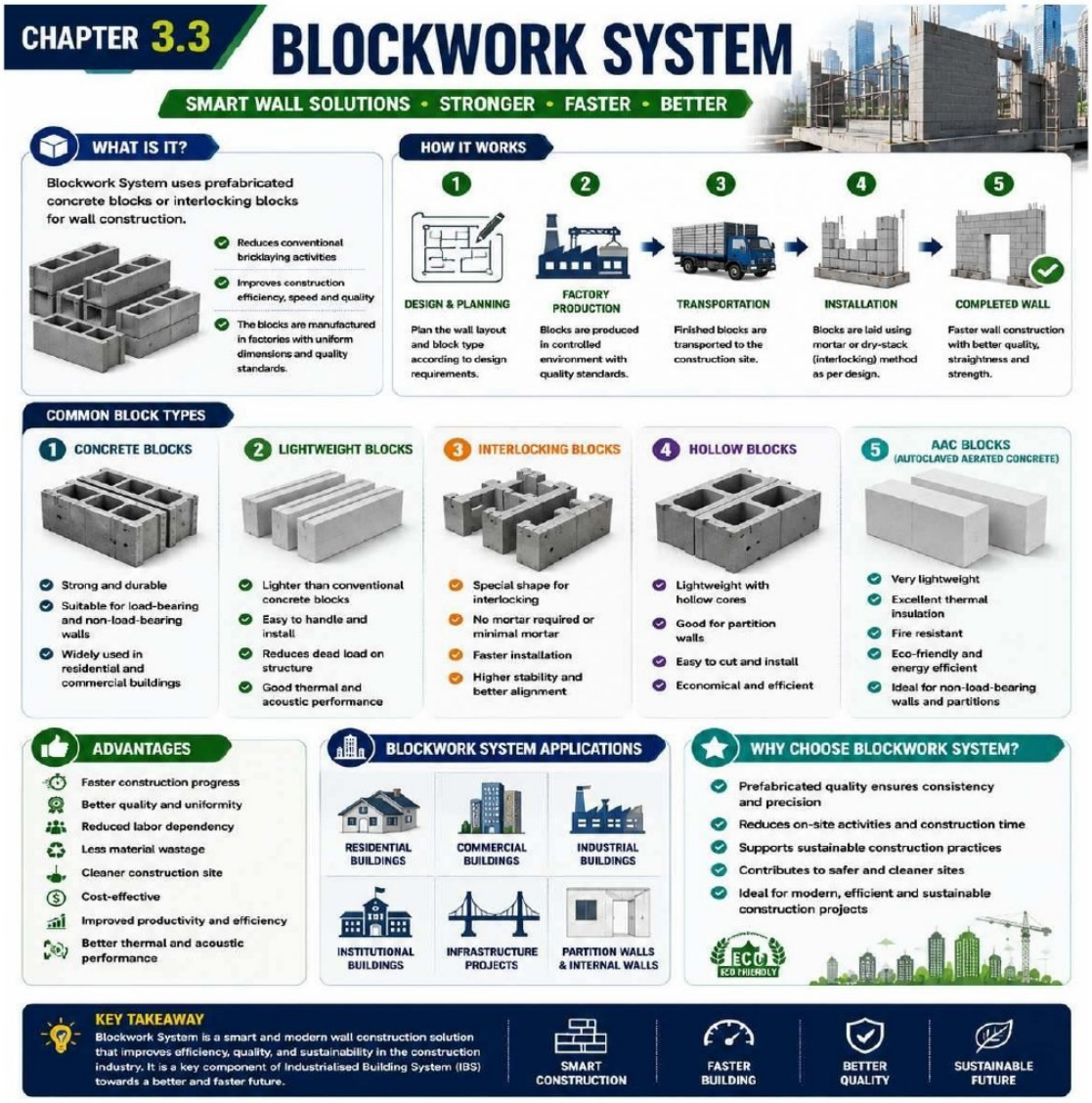
CHAPTER - 3.3 BLOCKWORK SYSTEM

Blockwork System uses prefabricated concrete blocks or interlocking blocks for wall construction. The system reduces conventional bricklaying activities and improves construction efficiency.

The blocks are manufactured in factories with uniform dimensions and quality standards.

Common block types include:

- Concrete blocks
- Lightweight blocks
- Interlocking blocks
- Hollow blocks
- AAC blocks (Autoclaved Aerated Concrete)



AR FILTER: BLOCKWORK SYSTEM

CHAPTER 3.4 - STEEL FRAMING SYSTEM

Steel Framing System is a modern IBS method that utilizes prefabricated steel components manufactured in factories before being assembled at construction sites.This system is known for its lightweight properties, structural strength, and rapid installation process.

Steel framing components include:

- Steel columns
- Steel beams
- Roof trusses
- Floor joists
- Wall framing systems
- Hollow sections
- C-channels and U-channels

Types of Steel Framing Systems

1. Cold Formed Steel System

2. Hot Rolled Steel System



AR FILTER: METAL FRAMING SYSTEM

CHAPTER 3.5 - TIMBER FRAMING SYSTEM

Timber Framing System uses prefabricated timber components for structural and non-structural construction works.

Timber is one of the oldest building materials and continues to be used in IBS construction due to its lightweight and environmentally friendly properties.

Main Components

Common timber framing components include:

- Timber wall frames
- Roof trusses
- Timber floor systems
- Timber panels



CHAPTER 3.6 - FORMWORK SYSTEM

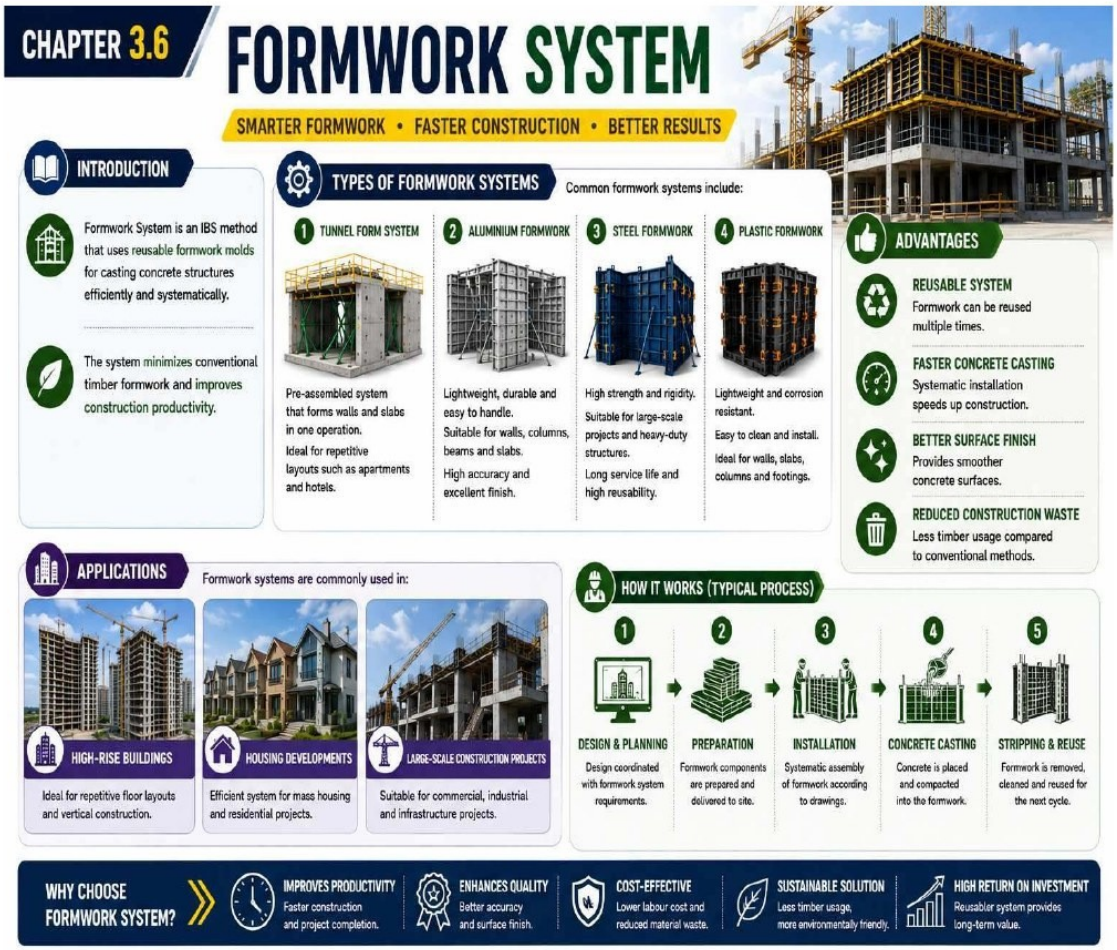
Formwork System is an IBS method that uses reusable formwork molds for casting concrete structures efficiently and systematically.

The system minimizes conventional timber formwork and improves construction productivity.

Types of Formwork Systems

Common formwork systems include:

- Tunnel form system
- Aluminium formwork
- Steel formwork
- Plastic formwork



AR FILTER: REUSABLE FORMWORK SYSTEM

CHAPTER 3.7 - INNOVATIVE SYSTEM

Introduction

Innovative System refers to advanced and non-traditional IBS technologies that combine modern construction methods, smart technologies, and industrialized manufacturing systems. This category includes new technologies that improve construction productivity, quality, sustainability, and digitalization.

Examples of Innovative Systems

Examples include:

- Modular construction
- 3D printing construction
- Smart IBS systems
- Hybrid IBS systems
- Container-based construction
- Volumetric modular systems



AR FILTER: INNOVATIVE SYSTEM

CHAPTER - 3.8 COMPARISON OF IBS SYSTEMS

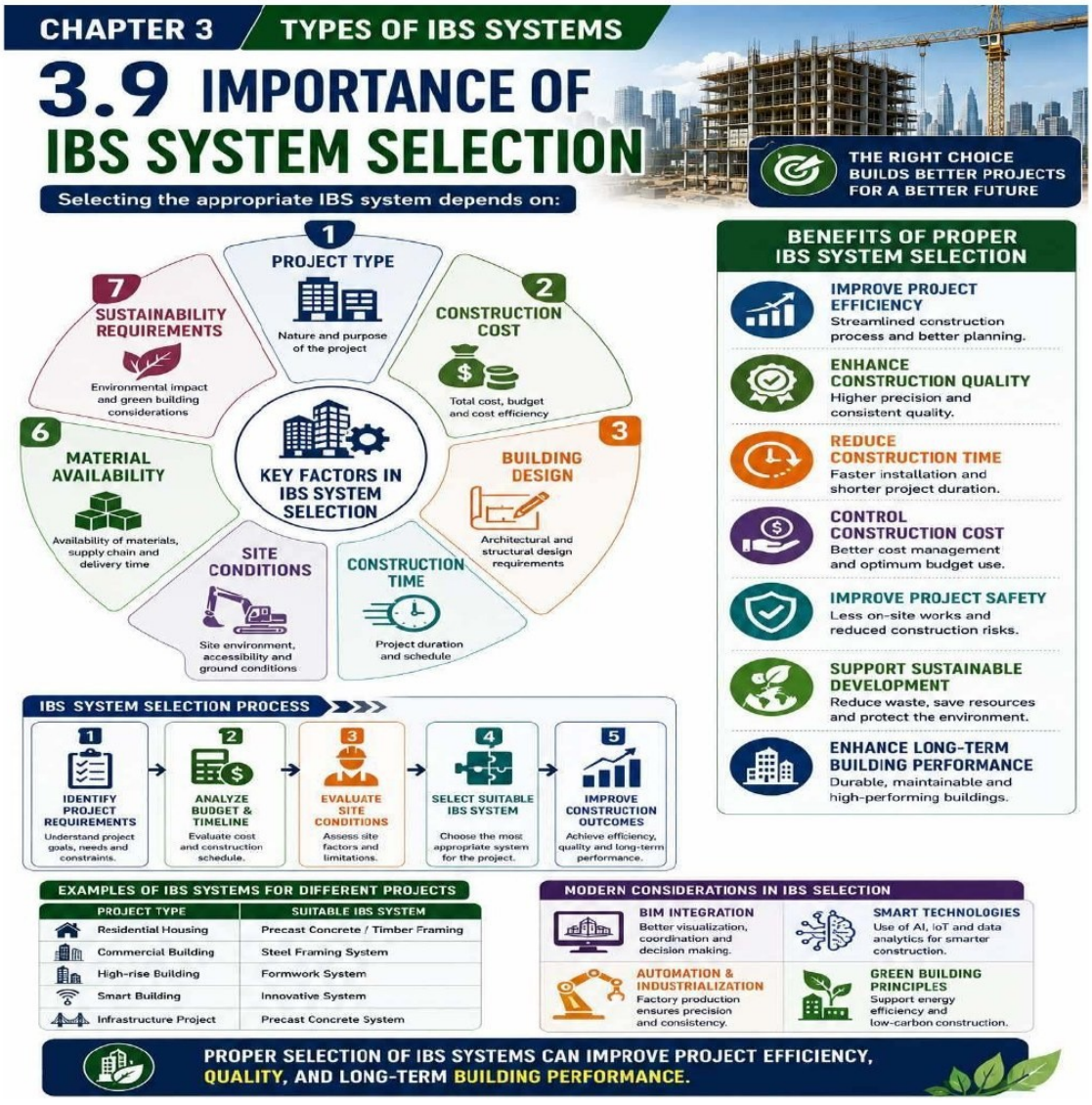


CHAPTER 3.9 - IMPORTANCE OF IBS SYSTEM SELECTION

Selecting the appropriate IBS system depends on:

- Project type
- Construction cost
- Building design
- Construction time
- Site conditions
- Material availability
- Sustainability requirements

Proper selection of IBS systems can improve project efficiency, quality, and long-term building performance.



CHAPTER 3.10 - SUMMARY

In conclusion, there are six main IBS systems commonly used in Malaysia, each offering unique advantages and applications within the construction industry. These systems play an important role in modernizing construction practices by improving productivity, reducing labor dependency, enhancing quality, and promoting sustainable construction.

As the Malaysian construction industry continues to evolve towards digitalization and industrialization, the adoption of IBS technologies is expected to increase significantly in the future. Understanding the characteristics and applications of each IBS system is essential for TVET students, contractors, engineers, and construction practitioners involved in modern construction projects.



AR MISSION 3

IBS SYSTEM COMPARISON LAB

Compare real product examples and select a suitable system for a project context.

LAUNCH PATH

Open Product Warehouse. Apply the system filter for Blockwork, Prec
Fran

FIELD TASK

1. Choose one product from three different IBS system filters.
2. Record the manufacturer, product or system name and likely application.
3. Compare connection, installation or material clues visible in the listing.
4. Recommend one system for a two-storey TVET training facility.

AR EVIDENCE RECORD

IBS SYSTEM	PRODUCT / MAKER	APPLICATION	SELECTION REASON

REFLECT AND JUSTIFY

Which selection factor changed your initial choice after viewing real products? Explain how the new evidence affected your decision.

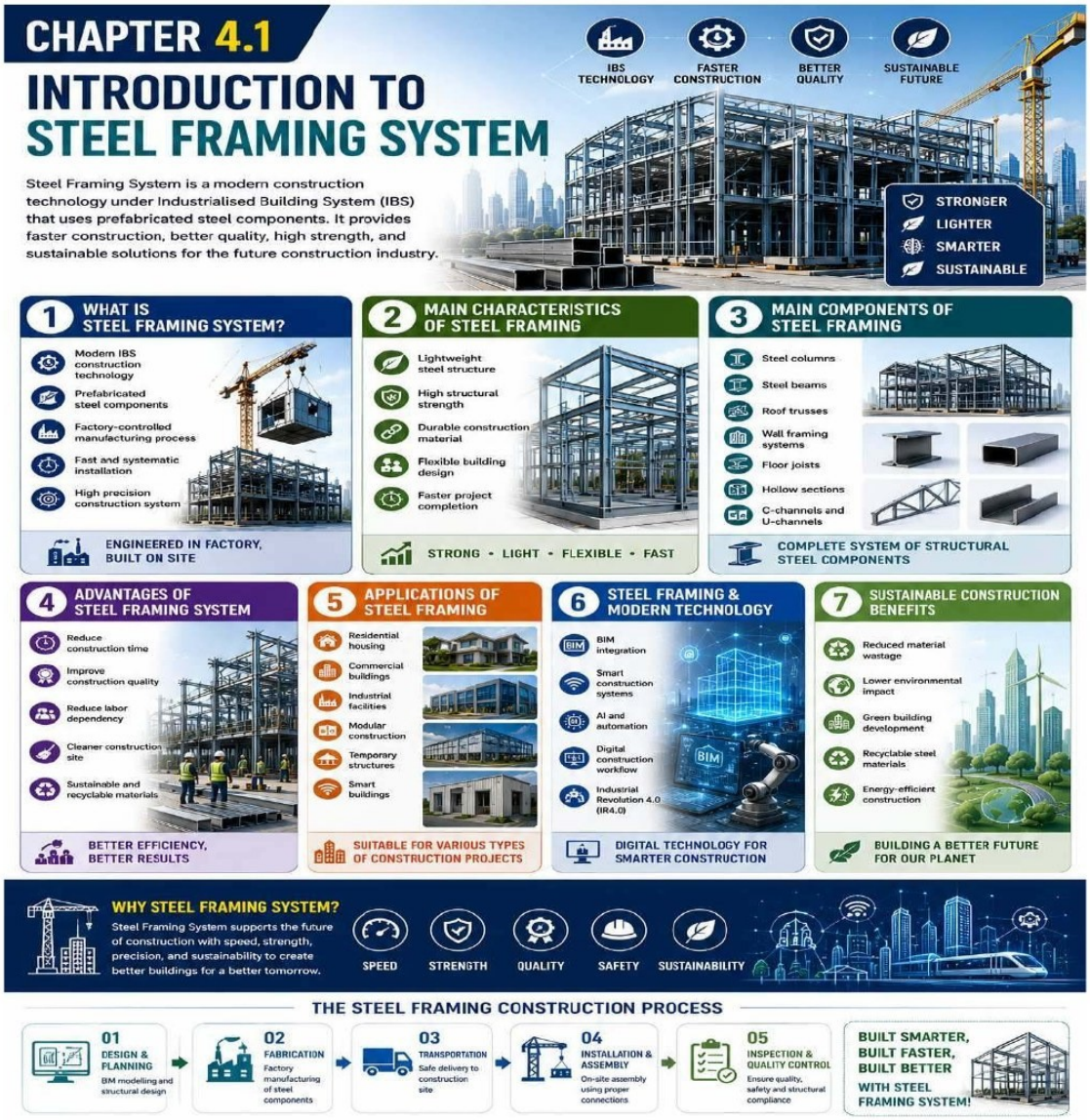
OPEN GALLERY

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CHAPTER 4

CHAPTER 4.1 – INTRODUCTION TO STEEL FRAMING SYSTEM

Steel Framing System is one of the most important technologies used in Industrialised Building System (IBS) construction. The system uses prefabricated steel components manufactured in factories before being transported and assembled at construction sites. Steel framing systems provide faster construction processes, better structural strength, improved quality control, and reduced labor dependency compared to conventional construction methods. Due to its lightweight properties, durability, and flexibility in design, steel framing systems are widely used in residential, commercial, industrial, and modular construction projects. The integration of steel framing systems with BIM, automation, and digital construction technologies supports the future of smart and sustainable construction industries.



EXPLORE IN AR: METAL FRAMING SYSTEM

CHAPTER 4.2 – WHAT IS STEEL FRAMING SYSTEM?

SHORT NOTES:

Steel Framing System is a modern construction method under the Industrialised Building System (IBS) that uses steel components as the main structural framework of buildings. The steel members are prefabricated in factories before being transported and assembled at construction sites. This system offers faster construction, higher precision, improved structural strength, and better quality control compared to conventional construction methods. Steel framing systems are widely used in residential, commercial, industrial, and modular construction projects due to their lightweight properties, durability, flexibility, and sustainable construction benefits.



CHAPTER 4.3 – TYPES OF STEEL FRAMING SYSTEMS

Steel Framing Systems are commonly divided into two main categories: Cold Formed Steel System and Hot Rolled Steel System. Both systems are widely used in modern Industrialised Building System (IBS) construction projects. Cold formed steel systems are lightweight and suitable for residential and light construction projects, while hot rolled steel systems provide stronger structural performance for heavy-duty and large-scale buildings. Steel framing systems offer faster construction processes, better structural quality, flexibility in design, and support sustainable construction practices. The integration of steel framing with BIM, digital construction, and Industrial Revolution 4.0 (IR4.0) technologies enhances modern construction efficiency and productivity.



CHAPTER 4.4 – MAIN COMPONENTS OF STEEL FRAMING SYSTEM

Steel Framing System consists of several important structural components that work together to form a strong, stable, and efficient building structure. These components are prefabricated in factories before being transported and assembled at construction sites. The main components include steel columns, steel beams, roof trusses, wall framing systems, floor joists, hollow sections, and C-channels and U-channels. Each component has its own structural function and contributes to faster construction, improved quality, and sustainable building development. The integration of steel framing systems with BIM and digital construction technologies further enhances modern construction efficiency and accuracy.



AR TASK: IDENTIFY MAIN COMPONENTS

CHAPTER 4.5 – CONSTRUCTION PROCESS OF STEEL FRAMING SYSTEM

The construction process of Steel Framing System involves a systematic and organized workflow starting from design and planning until final inspection and quality control. Steel components are prefabricated in factories using advanced manufacturing technologies before being transported and assembled at construction sites. This process improves construction efficiency, quality, safety, and productivity compared to conventional construction methods. The integration of BIM, digital construction systems, and automation technologies further enhances coordination, accuracy, and project management throughout the construction process.



AR TASK: TRACE THE CONSTRUCTION PROCESS

CHAPTER 4.6 – ADVANTAGES OF STEEL FRAMING SYSTEM

Steel Framing System offers many advantages compared to conventional construction methods. The use of prefabricated steel components improves construction speed, quality, safety, and efficiency while reducing labor dependency and material wastage. Steel structures are lightweight yet strong, making them suitable for various construction projects such as residential buildings, commercial facilities, industrial projects, and modular construction. In addition, steel framing systems support sustainable construction because steel materials are recyclable and environmentally friendly. The integration of steel framing with BIM, automation, and digital construction technologies further enhances modern construction productivity and project management.



CHAPTER 4.7 – DISADVANTAGES OF STEEL FRAMING SYSTEM

Although Steel Framing System offers many advantages in modern construction, there are also several limitations and challenges that need to be considered. The system may involve higher initial investment costs, corrosion risks, fire protection requirements, and the need for skilled workers during installation. In addition, transportation and coordination issues may affect project efficiency if not properly managed. Understanding these disadvantages is important for TVET students, contractors, engineers, and construction practitioners to ensure proper planning, maintenance, and safe implementation of steel framing systems in construction projects.



CHAPTER 4.8 – SAFETY PRACTICES IN STEEL FRAMING CONSTRUCTION

Safety practices are extremely important in Steel Framing Construction to ensure the protection of workers, equipment, and construction projects. Steel framing activities involve heavy materials, working at heights, lifting operations, welding works, and machinery usage that may expose workers to safety risks if proper procedures are not followed. Therefore, construction personnel must follow safety regulations, use Personal Protective Equipment (PPE), and apply safe working practices throughout the construction process. The implementation of modern technologies such as BIM, digital monitoring systems, and smart construction safety management can further improve safety performance and reduce construction accidents.



CHAPTER 4.9 – STEEL FRAMING AND BIM TECHNOLOGY

Building Information Modelling (BIM) plays an important role in modern Steel Framing Construction by improving project planning, coordination, visualization, and construction management. BIM technology allows engineers, architects, contractors, and project teams to create digital 3D models that contain detailed building information before construction begins. The integration of Steel Framing System with BIM improves construction accuracy, reduces errors, enhances communication, and supports faster project delivery. BIM also supports smart construction technologies, automation, digital project monitoring, and Industrial Revolution 4.0 (IR4.0) initiatives in the construction industry.



AR LINK: DIGITAL CONSTRUCTION EXPERIENCE

CHAPTER 4.10 – SUSTAINABLE CONSTRUCTION USING STEEL FRAMING

Sustainable construction is an important concept in modern construction industries that focuses on reducing environmental impact while improving resource efficiency and long-term building performance. Steel Framing System supports sustainable construction because steel materials are recyclable, durable, lightweight, and suitable for prefabrication processes. The use of prefabricated steel components reduces material wastage, minimizes on-site construction activities, and improves overall construction efficiency. In addition, the integration of BIM, smart construction technologies, and green building practices further enhances sustainability in steel framing construction projects.



CHAPTER 4.11 – APPLICATIONS OF STEEL FRAMING SYSTEM

Steel Framing System is widely used in modern construction due to its lightweight properties, high structural strength, fast installation process, and sustainable construction benefits. The system is suitable for various types of construction projects including residential housing, commercial buildings, industrial facilities, modular construction, and smart infrastructure development. Steel framing technology supports modern digital construction systems such as Building Information Modelling (BIM), automation, and Industrial Revolution 4.0 (IR4.0), making it an important solution for future construction industries. The flexibility and efficiency of steel framing systems continue to increase their applications in Malaysia and around the world.



AR TASK: MATCH PRODUCT TO APPLICATION

CHAPTER 4.12 – FUTURE OF STEEL FRAMING SYSTEM

The future of Steel Framing System is closely connected to the advancement of smart construction technologies, digital transformation, and sustainable development in the construction industry. Steel framing systems are expected to become more efficient through the integration of Building Information Modelling (BIM), Artificial Intelligence (AI), automation, robotics, and Industrial Revolution 4.0 (IR4.0) technologies. The increasing demand for faster construction, sustainable buildings, and smart infrastructure will continue to drive the adoption of steel framing systems in residential, commercial, industrial, and modular construction projects worldwide.



CHAPTER 4.13 – SUMMARY

Steel Framing System is one of the most important technologies in modern Industrialised Building System (IBS) construction. The system offers faster construction processes, stronger structural performance, better construction quality, improved safety, and sustainable building solutions compared to conventional construction methods. The integration of Steel Framing System with Building Information Modelling (BIM), Artificial Intelligence (AI), automation, and Industrial Revolution 4.0 (IR4.0) technologies further enhances construction efficiency and smart project management. Understanding steel framing technology is essential for TVET students, contractors, engineers, and construction practitioners to support the future development of smart, sustainable, and digital construction industries.



AR MISSION 4

STEEL FRAMING DETECTIVE

Identify steel framing solutions and evaluate their structural role and application.

LAUNCH PATH

Open Product Warehouse and select Metal Framing System unde

FIELD TASK

1. Find examples of lightweight framing, roof truss or structural steel systems.
2. Match each example to the relevant component or system type in Chapter 4.
3. Distinguish structural framing from cladding, wall or connection products.
4. Evaluate one example for speed, quality, safety and sustainability.

AR EVIDENCE RECORD

PRODUCT / SYSTEM	STRUCTURAL ROLE	CHAPTER 4 LINK	EVALUATION

REFLECT AND JUSTIFY

Select the most suitable metal framing solution for rapid construction. Defend your choice using two gallery observations and one limitation.

OPEN GALLERY

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CHAPTER 5 — MALAYSIAN IBS CASE STUDY (AGiBS)

CHAPTER 5.1 - Introduction to Malaysian IBS Case Study

Industrialised Building System (IBS) has become an important part of the Malaysian construction industry. Many government and private construction projects in Malaysia have adopted IBS technologies to improve construction quality, reduce project duration, enhance safety, and support sustainable construction development.

One of the well-known examples of IBS implementation in Malaysia is AGiBS (Ajiya Green IBS). AGiBS is a modern construction system developed by Ajiya Berhad that combines IBS technology with sustainable construction practices, lightweight steel framing systems, and modern manufacturing technologies.

AGiBS focuses on faster construction, improved building quality, cleaner construction methods, and environmentally friendly development. The system uses prefabricated steel components manufactured in factories before installation at construction sites.

This chapter introduces the concept of AGiBS, its construction methods, applications, benefits, challenges, and its role in supporting the future development of modern construction in Malaysia.

CHAPTER 5.2 - What is AGiBS?

AGiBS stands for Ajiya Green IBS. It is an Industrialised Building System developed using lightweight steel framing technology and sustainable construction principles.

The system utilizes prefabricated steel components manufactured in controlled factory environments before being transported and assembled at construction sites.

AGiBS combines:

- IBS technology
- Lightweight steel framing system
- Green building concept
- Modern manufacturing systems
- Sustainable construction practices

The system is designed to improve construction productivity, quality, and environmental performance.



5.4 Main Features of AGiBS

AGiBS includes several important features that support modern construction development.

Lightweight Steel Framing System

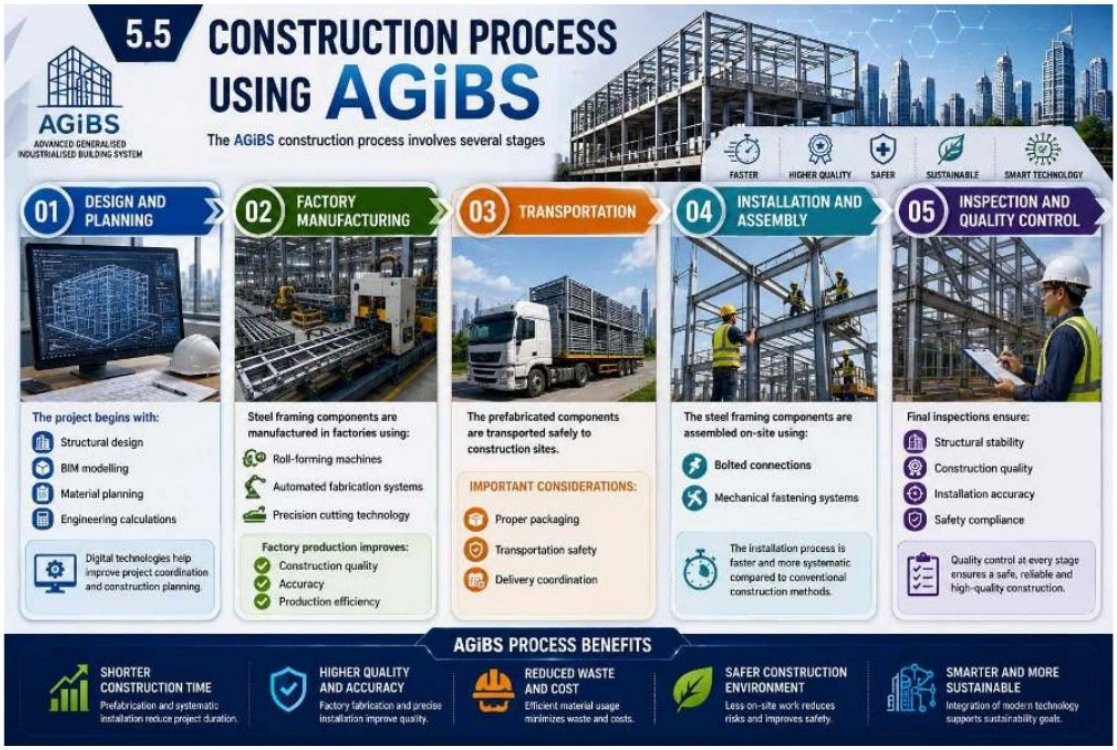
The system uses lightweight steel components with high structural strength and durability.

Advantages:

- Faster installation
- Lightweight structure
- Better structural performance

AR





AR TASK: TRACE THE AGiBS PROCESS

CHAPTER 5.6 - Applications of AGiBS in Malaysia

AGiBS is suitable for many types of construction projects.

Residential Housing

- Affordable housing
- Terrace houses
- Apartments

Commercial Buildings

- Office buildings
- Retail buildings
- Business premises

Educational Facilities

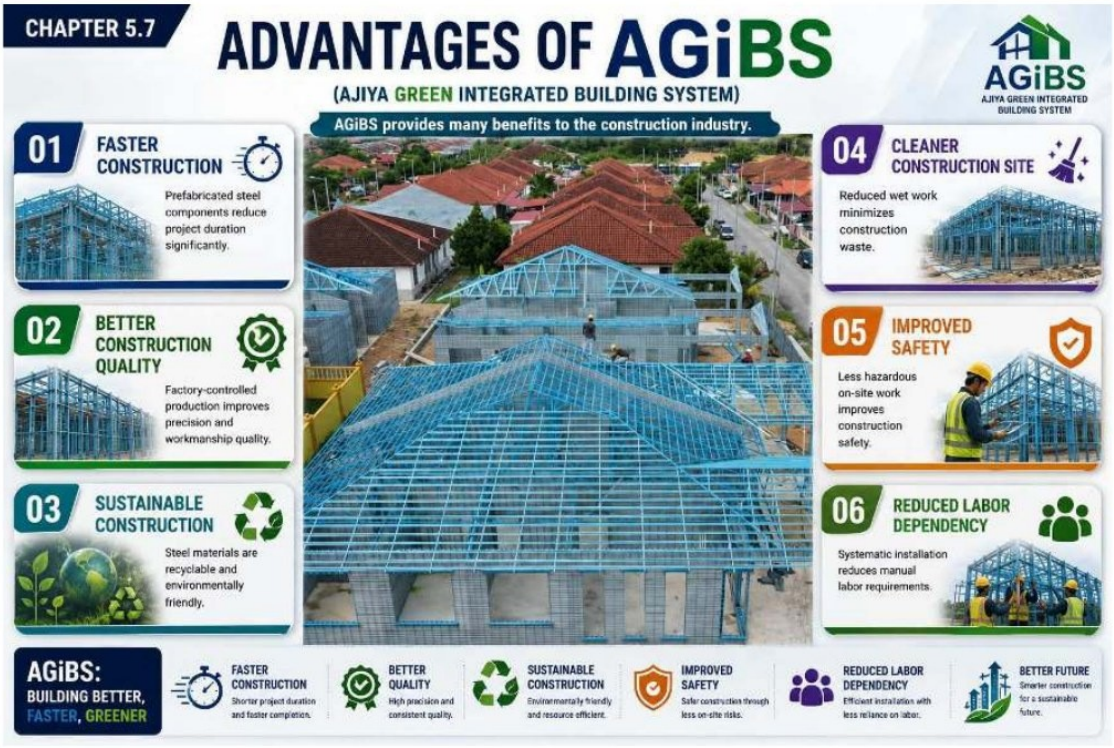
- Schools
- Colleges
- Training centers

Industrial Buildings

- Factories
- Warehouses
- Workshops

Modular Construction

- Temporary structures
- Site offices
- Disaster relief buildings



CHAPTER 5.6 - CHALLENGES OF AGIBS IMPLEMENTATION

Although AGiBS offers many advantages, several challenges still exist.

1. **Higher Initial Investment**

   Advanced manufacturing systems and machinery require higher startup costs.

2. **Need for Skilled Workers**

   Workers need technical knowledge in steel framing installation and IBS construction.

3. **Transportation and Logistics**

   Large prefabricated components require proper handling and coordination.

4. **Industry Awareness**

   Some contractors still prefer conventional construction methods.

5. **Design Coordination**

   Successful AGiBS projects require proper planning and coordination during design stages.



CHAPTER 5.10 - AGIBS AND SUSTAINABLE CONSTRUCTION

AGiBS strongly supports sustainable construction development in Malaysia.

Sustainable Benefits:

- Reduced construction waste
- Lower environmental impact
- Recyclable steel materials
- Cleaner construction environment
- Energy-efficient construction systems

The system also supports green building initiatives and environmentally friendly construction practices.



5.12 Importance of AGiBS for TVET Students

TVET students need to understand AGiBS because modern construction industries increasingly use industrialized and digital construction technologies.

Knowledge in AGiBS helps students:

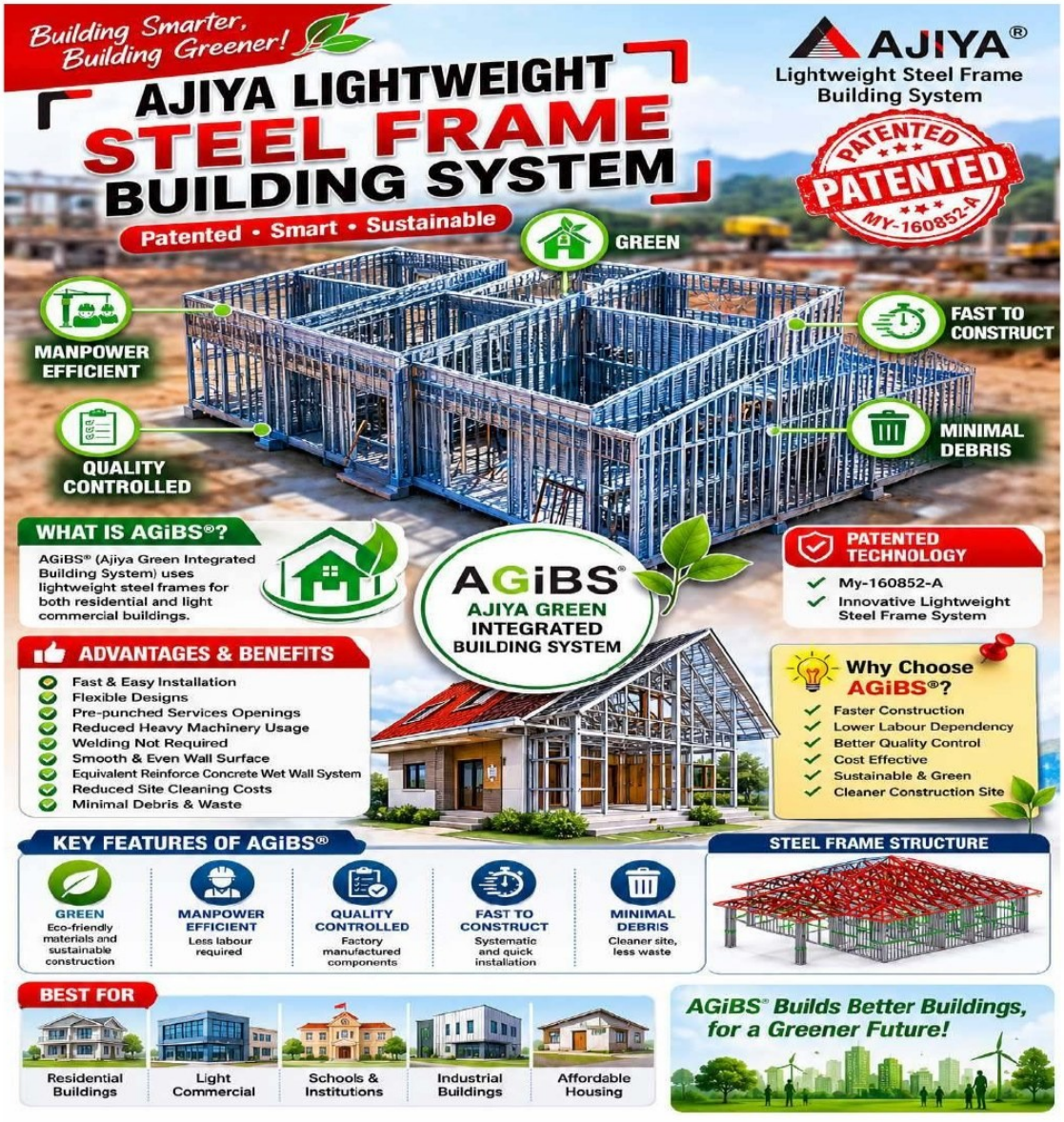
- Improve technical skills
- Understand lightweight steel framing systems
- Learn BIM and digital construction
- Prepare for future construction careers
- Support innovation in construction industries
-

5.13 Summary

In conclusion, AGiBS (Ajiya Green IBS) is a modern IBS construction system that combines lightweight steel framing technology, sustainable construction practices, and digital construction systems to improve productivity, quality, safety, and environmental performance.

The implementation of AGiBS supports the modernization of the Malaysian construction industry and aligns with the country's vision towards smart construction and sustainable development.

Understanding AGiBS technology is important for TVET students, contractors, engineers, and construction practitioners because the future construction industry is moving towards smarter, faster, greener, and more sustainable construction systems.



AR TASK: REVIEW A COMPLETE IBS SOLUTION

AR MISSION 5

SAMPLE HOUSE DESIGN REVIEW

Evaluate a complete building solution using the AGiBS and sustainable construction concepts.

LAUNCH PATH

Open Sample House. Choose IBS Open System, Bungalow House, Apar or IBS

FIELD TASK

1. Select one sample house and identify the likely IBS systems involved.
2. Separate factory activities from transport, installation and connection work.
3. Evaluate quality, labour, safety and environmental implications.
4. Propose one technical improvement for the selected building solution.

AR EVIDENCE RECORD

DESIGN ASPECT	OBSERVED / INFERRED EVIDENCE	AGiBS LINK	IMPROVEMENT

REFLECT AND JUSTIFY

Would you recommend this solution for a Malaysian institutional project? State your decision, two supporting reasons and one risk that must be controlled.

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AR MISSION 5

CHAPTER 6.0 – CONCLUSION

Industrialised Building System (IBS), especially Steel Framing System, plays an important role in transforming the modern construction industry towards smarter, faster, safer, and more sustainable construction practices. The implementation of IBS technologies improves construction productivity, quality, safety, and environmental performance while reducing dependency on conventional labor-intensive methods. In Malaysia, the adoption of IBS systems such as AGiBS (Ajiya Green IBS) demonstrates the industry's commitment towards innovation, green construction, and digital transformation. The integration of Building Information Modelling (BIM), Artificial Intelligence (AI), automation, and Industrial Revolution 4.0 (IR4.0) technologies further strengthens the future of modern construction. For TVET students, engineers, contractors, and construction practitioners, understanding IBS technology is essential to prepare for the future construction industry.



AR PORTFOLIO

AR EVIDENCE PORTFOLIO

A concise assessment guide for an evidence-based final submission.

20 MARKS

EXPLORATION EVIDENCE

Accurate observations from the gallery and complete mission records.

20 MARKS

COMPONENT IDENTIFICATION

Correct system, component, material and structural role.

20 MARKS

TECHNICAL EXPLANATION

Clear explanation of production, connection and installation.

25 MARKS

COMPARISON AND DECISION

Reasoned selection using quality, time, cost, safety and sustainability.

15 MARKS

REFLECTION AND DIGITAL PRACTICE

Independent insight, source acknowledgement and responsible use.

EXIT TICKET

1. The most useful gallery evidence was...
2. My strongest technical decision was...
3. One question I still need to investigate is...

REVISIT GALLERY

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100 MARKS

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A COMPLETE STEP-BY-STEP GUIDE

IBS STEEL FRAMING SYSTEM

MODERN CONSTRUCTION TECHNOLOGY FOR TVET AND INDUSTRY

The construction industry is moving towards methods that are **faster, safer, more precise and more sustainable**. This eBook introduces the Industrialised Building System (IBS) with a focus on **cold-formed and hot-rolled steel framing** — from core concepts and Malaysia's IBS agenda to components, installation processes and a real Malaysian case study. Written in clear, practical English for **TVET students, educators, contractors, site supervisors and construction practitioners**, the AR Interactive Edition links every chapter to the **CIDB IBS Virtual Gallery** through QR codes, so readers can explore real 3D exhibits and apply what they learn with evidence.

POLITEKNIK MALAYSIA
MERLIMAU

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